

WHAT IS CLAIMED IS:

1. An electrophoresis apparatus comprising:

an inlet opening for introducing a sample to be analyzed;
a transport capillary extending in a longitudinal direction;

at least one separation capillary disposed at a pre-selected angle relative to said transport capillary;

at least one analyte concentrator positioned adjacent to said transport capillary and said separation capillary;

said analyte concentrator including a plurality of microstructures;

said microstructures carrying at least one affinity element adapted to attract at least one analyte of interest from said sample which passes through said analyte concentrator; and

a detector means for identifying and characterizing said analyte of interest.

2. The electrophoresis apparatus of claim 1 wherein said separation capillary is perpendicular to said transport capillary.

3. The electrophoresis apparatus of claim 1 wherein said analyte concentrator is positioned at the intersection between said transport capillary and said separation capillary.

4. The electrophoresis apparatus of claim 1 wherein a plurality of separation capillaries are disposed at pre-selected angles relative to said transport capillary.
5. The electrophoresis apparatus of claim 4 wherein a plurality of analyte concentrators are positioned adjacent to said transport capillary and said plurality of separation capillaries.
6. The electrophoresis apparatus of claim 1 wherein a plurality of separation capillaries are perpendicular to said transport capillary.
7. The electrophoresis apparatus of claim 6 wherein a plurality of analyte concentrators are positioned at the intersection between said transport capillary and said plurality of separation capillaries.
8. The electrophoresis apparatus of claim 7 wherein said inlet opening is provided by an introduction capillary having first and second ends with a non-selective analyte concentrator disposed therebetween.
9. The electrophoresis apparatus of claim 8 wherein said introduction capillary is connected to said transport capillary by a valve.

10. The electrophoresis apparatus of claim 1 wherein said affinity element is an analyte-specific antibody.
11. The electrophoresis apparatus of claim 1 wherein said analyte concentrator has a matrix-like assembly provided by a plurality of microstructures taken from the group consisting of beads, platelets, chips, fibers or filaments.
12. The electrophoresis apparatus of claim 11 wherein said analyte concentrator is defined by porous end walls disposed in said transport capillary and said separation capillary.
13. The electrophoresis apparatus of claim 1 having an additional analyte concentrator disposed in said separation capillary.
14. The electrophoresis apparatus of claim 13 wherein said additional analyte concentrator has a plurality of microstructures carrying a pre-selected chromophoric agent.
15. An electrophoresis apparatus comprising:
 - an inlet opening for introducing a sample to be analyzed;
 - a transport channel extending in a longitudinal direction;
 - at least one separation channel disposed at a pre-selected angle relative to said transport channel;
 - said transport channel and said separation channel being formed in a microchip;

an analyte concentrator positioned adjacent to said transport channel and said separation channel;

said analyte concentrator including a plurality of microstructures;

said microstructures carrying at least one affinity element adapted to attract at least one analyte of interest from said sample which passes through said analyte concentrator; and

a detector means for identifying and characterizing said analytes of interest.

16. The electrophoresis apparatus of claim 15 wherein said separation channel is perpendicular to said transport channel.
17. The electrophoresis apparatus of claim 15 wherein said analyte concentrator is positioned at the intersection between said transport channel and said separation channel.
18. The electrophoresis apparatus of claim 15 wherein a plurality of separation channels are disposed at pre-selected angles relative to said transport channel.
19. The electrophoresis apparatus of claim 18 wherein a plurality of analyte concentrators are positioned adjacent to said transport channel and said plurality of separation channels.

20. The electrophoresis apparatus of claim 15 wherein a plurality of separation channels are perpendicular to said transport channel.
21. The electrophoresis apparatus of claim 20 wherein a plurality of analyte concentrators are positioned at the intersection between said transport channel and said plurality of separation channels.
22. The electrophoresis apparatus of claim 21 wherein said inlet opening is provided by an introduction channel having first and second ends with a non-selective analyte concentrator disposed therebetween.
23. The electrophoresis apparatus of claim 22 wherein said introduction channel is connected to said transport channel by a valve.
24. The electrophoresis apparatus of claim 15 wherein said affinity element is an analyte-specific antibody.
25. The electrophoresis apparatus of claim 15 wherein said analyte concentrator has a matrix-like assembly provided by a plurality of microstructures taken from the group consisting of beads, platelets, chips, fibers or filaments.

26. The electrophoresis apparatus of claim 25 wherein said analyte concentrator is defined by porous end walls disposed in said transport channel and said separation channel.
27. The electrophoresis apparatus of claim 15 having an additional analyte concentrator disposed in said separation channel.
28. The electrophoresis apparatus of claim 27 wherein said additional analyte concentrator has a plurality of microstructures carrying a pre-selected chromophoric agent.